

CLAIM OR CLAIMS

WHAT IS CLAIMED IS:

1. A method of indexing and searching a video database containing a plurality of video shots comprising the steps of:
 - for each video shot estimating 3-D camera motion parameters from successive pairs of images in the video shot;
 - computing a rate of motion for each image from the video shot using the 3-D camera motion parameters;
 - indexing the video shot by types of camera motion based on the rate of motion and a sign of the 3-D camera motion parameters; and
 - repeating the estimating, computing and indexing steps for each video shot in the video database.
2. The method as recited in claim 1 further comprising the step of searching for video shots within the video database based on a selected one of the types of camera motion.
3. The method as recited in claim 2 wherein the types of camera motion are selected from the group consisting of tracking, booming, dollying, panning, rolling, tilting and zooming.
4. The method as recited in claim 1 wherein the estimating step comprises the steps of:

computing image feature points from each consecutive pair of
images in the video shot;

computing image intensity contrast variation to select pixels from
the images to be used;

5 tracking the image feature points from image to image in the given
shot to identify matched feature points;

pruning the matched feature points using the image intensity
contrast variation; and

10 computing iteratively from the matched feature points a best set of
matrices representing translation and rotation of the images.

5. The method as recited in claim 4 wherein the computing step comprises
the steps of:

15 computing rates of tracking, booming and dollying from the
translation matrix for each image feature point;

computing a focus of interest as a point in each image at which all
image motions converge as a function of the translation matrix; and

20 obtaining a vector descriptor for each consecutive pair of images as
a function of the rates of tracking, booming and zooming, and the focus of
interest as the rate of motion.

6. The method as recited in claim 5 wherein the indexing step comprises
the steps of:

computing how much larger the tracking and booming rates are compared to the dollying rate as a first ratio;

computing how much larger the dollying rate is compared to the tracking and booming rates as a second ratio;

5 generating an index file for the video shot containing a string of ones and zeros for each of the types of camera motion.

7. The method as recited in claim 6 wherein the searching step comprises the steps of:

10 querying the video database with a selected one of the types of camera motion;

processing the selected one of the types of camera motion to find the video shots satisfying selected one of the types of camera motion; and

displaying the video shots satisfying the processing step.